

SYMMETRY IN INTERACTIVE ART
SHORTESS, George K.

Artist and Professor of Psychology
Department of Psychology CU#17
Lehigh University
Bethlehem, PA 18015

In this paper I will provide a psychological framework for understanding and appreciating my interactive art works which are themselves artistic statements of perception and cognition.

Before developing these ideas, several distinctions are necessary. First, the discussion will be limited to visual art and visually based art. By visually based art I mean works such as installations and events which might involve other senses besides vision, but which have significant visual components and are rooted in the visual experience. Second, while all art involves an interaction of the viewer with an object or event, interactive art makes explicit this idea and requires the viewer to become more involved than the detached contemplation often associated with the aesthetic experience. In my own work, movement by the viewer activates photocells or other sensors which then, through a computer interface, change the sound or visual environment which is the art object.

The basis of the psychological framework is the symmetrical relationships between forms of stimulus energy outside of the viewer and the mental models of those stimuli in the viewer's mind. A mental model is defined as the viewer's conceptualization or representation of the interactive art piece and the way it works. The axis of symmetry in this case lies at the interface between the viewer and the external world, as shown in Fig. 1.

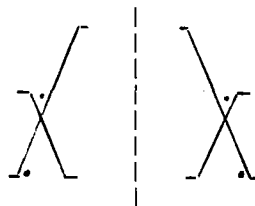


Fig. 1. Schematic diagram of the symmetry between the structure of the external energy and matter on the right and the mental model of that stimulus on the left.

Since the specific types of energy and matter in the internal

and external representations are quite different, the symmetry is in the correspondence not only between the representational information of the objects such as the shape of a tree or the redness of a piece of rope, but also between the formal underlying structures of the two representations, such as the vertical or the horizontal orientation.

To make the discussion more concrete, I will describe an installation that I was commissioned to do in 1987 for an outdoor public arts festival. Fig. 2 is a sketch of the piece.

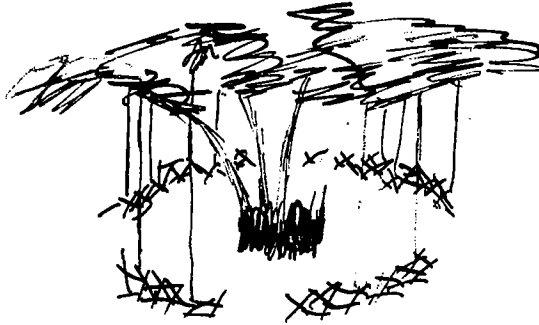


Fig. 2. Sketch of interactive art work, Mayfair Network

The central element was a willow tree, 35-40 feet high. Surrounding the tree was a ring of about 80 logs piled together about 3 feet high, with several gaps in the ring so that viewers could enter and walk around inside the piles of logs. Strands of red rope were hung from the tree over the logs and were draped among them. Inside the ring there were photocells connected to a small computer that could generate sounds in eight speakers - four in the tree and four among the logs. I envisioned it both as a playful piece of art and as a metaphor on the nature of our perceptual experience. Viewers inside the logs and ropes were generating the sounds as they activated the photocells by their movements. In this way they created their own inner nonspatial world while looking out over the logs and through the red rope at the spatial "reality" of the external world. Some immediately either accepted it as a playful art work or got an intuitive sense of the inner-outer world metaphor. However, the dominant initial response was to try to figure out how the piece worked, and then experience it as an art work. Some viewers discovered the photocells and so understood the mechanism. Many others, however, developed the idea that pulling on the red ropes caused the sounds and even told friends to go over and make sounds with the ropes.

Clearly the work was about the symmetry between inner and outer worlds. Recognition of this symmetry added to the understanding and appreciation of the piece as art. But can we

go further and try to understand more about the nature of the structure of these worlds and the symmetrical relationships? Can a mental model be a work of art? How do these phenomena fit with other work on mental models?

Norman (1983) described a number of characteristics of mental models based on work with devices such as calculators, cameras, watches and aircraft. To use his terms, these models are "incomplete..., unstable..., unscientific..., and parsimonious"(p. 8). Furthermore, they "do not have firm boundaries" (p. 8). The terms, incomplete and unscientific, certainly describe some of the mental models developed for Mayfair Network. These models were based on the casual and uncontrolled observation that pulling on the ropes was often followed by sounds. The people assumed that there was a causal relationship, without testing the alternate hypothesis that people inside were generating the sounds. They developed "superstitious behavior" from the sequence of events and persisted in it even when it did not always happen. Several people did not seem to believe me when I explained about the photocells. The pulling model was more parsimonious and simpler than photocells and computers. Based on these informal observations we might assume that some of the salient features of the art work which were symmetrically mapped into the mental model were representations of the red rope and the contingency between the pulling action and the sound. I would consider this mapping as part of the work itself.

Going one step further we can ask about the type of mental model that might be operating. One candidate is the strong analogy model (Young, 1983) which emphasizes the role of familiar devices in understanding new devices. Applying this to interactive art, we might want to know to what extent Mayfair Network was viewed as analogous to an art work or to a piece of playground equipment. Both seemed to be operating in different people although the conditions which produced these different models was not altogether clear. I will be expand on this discussion with other art work and other models.

I will also discuss the need to incorporate structural properties of interactive art works into mental models, based on Arnheim's theory of visual vectors and balance (e.g. Arnheim, 1983; 1988). The information presented above was primarily representational about what was perceived to be there: trees, rope, etc. Structural information, such as symmetry within the work, the roles of vertical, horizontal and diagonal lines in creating visual balance, etc. are all factors that are important means of communication between the artist and the viewer. They would therefore seem to be involved in creating mental models.

In summary, I have tried to show that in order to fully

appreciate interactive art it is necessary to understand the nature of mental models. Viewing interactive art as a form of symmetry between the art object and the mental model may help us to understand these processes and to design better art. In addition, this unique conceptualization provides an added layer of meaning to the aesthetic experience. The models are part of the total art work as a process piece, and they live on after the physical object is gone.

References

Arnheim, R. (1983) The Power of the Center. Berkeley, CA: University of California Press.

Arnheim, R. (1988) Visual Dynamics. American Scientist, 76, 585-591.

Norman, D. A. (1983) Some Observations on Mental Models. In D. Gentner & A. L. Stevens (Eds.) Mental Models, Hillsdale, NJ: Erlbaum, 7-14.

Young, R. M. (1983) Surrogates and Mappings: Two Kinds of Conceptual Models for Interactive Devices. In D. Gentner & A. L. Stevens (Eds.) Mental Models, Hillsdale, NJ: Erlbaum, 35-52.